

Pamphlet

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THEATRE HYGIENE:

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A scheme for the study of a
somewhat neglected Department
of the public health.

By

WALTER

E.

ROTH

BY THE SAME AUTHOR.

THE ELEMENTS OF SCHOOL HYGIENE :

FOR THE USE OF TEACHERS IN SCHOOLS.

(With a Bibliography.)

BAILLIÈRE, TINDALL, AND COX, LONDON, 1886.

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THEATRE HYGIENE:

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A Scheme for the Study of a somewhat neglected
Department of the Public Health.

BY

WALTER E. ROTH, B.A.,

Late Demy of Magdalen Coll., Oxon,

AUTHOR OF 'THE ELEMENTS OF SCHOOL HYGIENE,' ETC.



LONDON:
BAILLIÈRE, TINDALL AND COX,
KING WILLIAM STREET, STRAND.



TO THE MEMORY
OF
MY BELOVED BROTHER,
ALFRED LAWRANCE ROTH,
WHO FELL ASLEEP 16TH DECEMBER, 1887,
THE FOLLOWING PAGES
ARE
Affectionately Dedicated
BY
THE AUTHOR.



P R E F A C E.

My earlier investigations into this particular branch of the public health were embodied in two articles published in the *Sanitary Record* for June and September, 1887, the former paper dealing more especially with fires in theatres, and the legal aspects connected therewith.

Subsequently, at the Sydney Technical College, under the auspices of the New South Wales Government Board of Technical Education, I delivered a course of two lectures on Theatre Hygiene, and for that purpose made inquiries into the state of the Sydney theatres : the results of my investigations are comprised in the following pages for the purposes of illustrating the text, and can all be defended by the 'Report of the New South Wales Commission on Theatres,' etc., appointed in June, 1886, and by a Parliamentary Paper, 'The Inspection of Theatres,' etc., drawn up by the Colonial Architect, and dated 7th November, 1887. The various tables, etc., have been drawn up from these official sources. So far as the requirements of construction and fittings of theatres in general are concerned, I have adapted from the rules and regulations of many well-

known authorities, both English and Continental : on the other hand, not a few of these essentials are original.

I have to express my thanks to Mr. R. Kingdon Ellis for the unenviable task of correcting the text and revising the proofs.

W. E. R.

42, COLLEGE STREET, SYDNEY, N.S.W.,
12th February, 1888.

Twenty-four theatres were destroyed by fire in 1888. Of these six were in the United States, five in England, four in France, two in Russia, two in Belgium, one in Hungary, one in Spain, one in Portugal, one in Roumania, and one in China.

THEATRE HYGIENE.

'THEATRE HYGIENE' may be described shortly as the study of the best structural and decorative arrangements to be adopted in the construction and fittings of theatres, music-halls, and kindred establishments, together with a consideration of the sanitary and physical conditions of stage-life generally. The object in view is the health, comfort, and safety, not only of the public, but of the players and other people employed.

The terrible disasters at the Ring Theatre in Vienna, at the Paris Opéra Comique, and still more recently at the Exeter Theatre in England, afford ample illustration of the dangers to which both audience and performers are, and assuredly will continue to be, exposed, so long as this question of reform in theatre construction, supervision, and management, is so outrageously neglected as it is at present. Indeed, no better testimony can be adduced for demonstrating the importance of investigating such a subject than the evidence elicited by official and other inquiry consequent on such catastrophes. Taking into consideration only the inquiry as to prevention of fire and panics, the fact cannot honestly be denied that, even at the present moment, the precautions and regulations adopted at the average playhouse are insufficient to obviate the repetition of these calamities. The causes, the sequence of events, which co-operated in the wholesale destruction of so much life there, are precisely similar to those which are liable any day to arise here; the structural condition of the buildings was notori-

ously defective, the outer doors were kept locked, the staircases were badly constructed, and the exits far from adequate. Unfortunately the example set before us in this respect by the central city of the whole civilized world is even one to be avoided, not followed; for at the present moment there is not a single London theatre which structurally can be considered perfect, which obeys the prescribed regulations, and which maintains all its appliances and arrangements in thorough working order and repair. Such, then, being the case, it is somewhat remarkable to find that inquiries on so important a branch of the public health have hitherto been neglected, and all the more so in countries which are supposed to pride themselves on the excellence of their sanitary laws and institutions. It is true that here and there some official report has been made on actual defects in existing structures, and perhaps certain alterations recommended; it is equally true that certain world-renowned architects have made the lighting, warming, and ventilation of public buildings objects of special study; but until two years ago the sanitary aspects of theatre-life generally—the true Theatre Hygiene—appear to have been entirely overlooked. There then appeared a short series of articles written anonymously in the *Stage* newspaper: this was followed a little more than a year later by a more elaborate paper in the *Sanitary Record* on ‘Some Suggestions and Materials for a Study of the Hygiene of the Theatre.’ It may not be out of place here to mention that some of the earliest and at the same time scientific investigations into the sanitation of theatres were made by Dr. Tripier of Paris, who published his results in 1859. This gentleman, who is still living, has often been consulted for an opinion not only as to remedying structural defects in already existing French theatres, but also as to the hygienic requirements of proposed new ones—an example which it would bewell for some of our managers to bear in mind and imitate.

The *site* upon which a theatre is built should be such as to admit of the building being free on all sides; this is necessary to allow egress to the open air, also for light and ventilation, as

well as for the safety of the adjoining buildings in case of fire, to give room for the operations of the fire-brigade (C.S.T.),* and to allow of the construction of a system of external balconies, to which reference will be made below. The entire site should be covered with a layer of cement-concrete 18 inches in thickness (C.S.T.) so as to ensure dry foundations.

External walls to be of brick, or partly of brick and partly of stone, of a strength and thickness not less than that prescribed by the City Acts, and carried up to a height proportioned to the width of the street. 'Captain Shaw lays down the rule that the combined height of the buildings on both sides of the street should not be greater than double the width of the latter; for instance, buildings of 60 feet and 30 feet in height respectively might safely occupy opposite sides of a street 45 feet wide.'

Unless separated by brick and fire-proof construction, no *scene-dock, workshop, property-room, or store-room* to be permitted within the building. In cases where the theatre forms a part only of a building, such theatre to be separated from the other parts of the building by proper *party-walls* or party-structures (M.B.W.).† This essential is of great import in Sydney, where the majority of the theatres are in direct connection with hotels.

The *roof, ceiling, stage and its supports, the galleries, flies, and stage machinery*, etc., to be, as far as possible, constructed of fire-resisting materials; all wood, canvas, or other material used in construction or for properties to be coated with silicate of potash or other fire-resisting liquid or substance, and lightning-conductors provided to roof (C.S.T.)

On making an inspection into the state of the Sydney theatres, it appears somewhat strange that in the large majority of cases the above essentials, the first principles, so to speak, of theatre construction, are conspicuous by their absence. This anomaly is explicable, perhaps, on one or more of the following grounds—ignorance and mammon, increased value of the land,

* Commission of Sydney Theatres, etc.

† Metropolitan Board of Works (London) regulations.

and, in not a few cases, the conversion into a playhouse of some building not originally designed or constructed for such purpose. Owing to the exceptionally high and increasing value which building-land has reached of late years, managers of recently-erected theatres naturally look after their own interests in securing new patronage by adjusting—no word can be better—the maximum of spectators in the minimum of space, and at the same time limiting the accommodation in all directions. On the other hand, managers of existing structures are prevented making any radical changes, on account of the keen competition which increased prices, consequent on the reduced accommodation, would certainly give rise to. In either direction, then, the management is severely handicapped, and to economize space many devices have been resorted to, such as lumbering up the basement under the stage with property sent down through the traps, having portions of the buildings set aside for hotel, shop, or other business purposes, placing the orchestra under the stage, the dressing-rooms under the auditorium, and trying other expedients alike incompatible with health and safety. Or again, is it to be wondered at that a theatre is defective from the very foundations up, when such a structure was originally designed for a guildhall, with level floor and no stage, a bazaar and auction mart, or even a billiard-room? (See Table of Exits.)

In any house or other place of public resort, for the public performance of stage-plays, or where a proscenium shall be erected, the *proscenium* wall to be of brick, not less than 13 inches in thickness, and carried up to a height of 3 feet above the roof, and be carried down below the stage, to the level of the foundation of the external walls (M.B.W.). The opening in the proscenium wall, next the auditorium, over stage, to have a safety fireproof curtain. No other openings to be formed in the proscenium wall, with the exception of a doorway into the orchestra, and one doorway on each side of the stage for communication with the auditorium. These doorways should not be more than 3 feet 6 inches wide, and closed with [self-acting] iron doors, fixed without woodwork (M.B.W.).

The necessity of thus separating stage from auditorium by fireproof construction will readily be understood, when it is remembered that in cases of conflagration the stage, with its connections of dressing-rooms, painting-room, etc., almost invariably proves a most fruitful source of danger (see Table of Doorways, etc.); and that, more than once, panic amongst the audience, and consequent loss of life, have been prevented by lowering the iron curtain, and thus shutting out the burning material from view. A fireproof proscenium wall (see Table, p. 14) is of little or practically no use without its curtain of incombustible material, and all the less so when no means have been adopted where such curtain can either be raised or lowered. Similarly, a well-constructed wall would be of little avail in cases of emergency in checking the onward progress of the smoke and flames, if, as in some of the theatres here, there are no doors at all to the openings, or when there do happen to be doors, they are not rendered fireproof. For reasons somewhat analogous, it is essential that the proscenium wall be, on the one hand, carried well up above the roof, and, on the other, carried down to level of foundation of the external walls.

The *staircases*, and the floors of the passages, lobbies, corridors, and landings, to be of fire-resisting materials, and well lighted. Every staircase for the use of the audience to be supported and enclosed by brick walls; strong hand-rails of approved construction to be securely fixed on each side of every stairway; the treads of each flight of stairs to be of uniform width, and no winding-stairs permitted. No staircase, internal corridor, or passage-way for the use of the audience, to be less than 4 feet 6 inches wide and 8 feet high. Every staircase, corridor, or passage-way for the use of the audience, and which communicates with any portion of the house intended for the accommodation of a larger number of the audience than 400, to be increased in width by 6 inches for every additional 100 persons, until a maximum width of 9 feet be obtained. Provided, however, that in every case where the staircases are 6 feet wide and upwards, a dividing hand-rail is fitted (M.B.W.).

PROSCENIUM WALL.

THEATRE.	MATERIAL.	THICKNESS.	HEIGHT.	OPENINGS IN WALL.	CURTAIN.
Her Majesty's Theatre	Brickwork	27 in. to iron girder which carries brickwork over proscenium opening, 18 in. beyond this	Carried up through roof	On both sides to various parts of house; iron-plate doors swinging both ways	Skeleton iron-work frame, with asbestos cloth curtain. At present, no means adopted for lowering or raising it
Theatre Royal	Stud and board partition: covered with canvas		Up to ceiling [which is of same material]		No fireproof curtain
Criterion Theatre	Brick	14 in.	To 12 or 14 ft. above roof of auditorium	To various parts. No fireproof doors. Some no doors at all	No fireproof curtain
Standard Theatre	Wood and canvas		To line of ceiling		No fireproof curtain
Opera House	Brick; archway and decorations of wood and canvas				No fireproof curtain
Gaiety Theatre	Wood: covered on side next stage with sheet-iron. Not fireproof		Not continued through ceiling		No fireproof curtain
Alhambra Music Hall	Usual wood and canvas				No fireproof curtain

DOORWAYS OPENING (1) ON STAGE; (2) ON AUDITORIUM.

Theatre Royal	..	Doorway under stage communicates with temporary buildings (dressing-rooms, scene-dock, property-room) without any door either of iron or wood	
Her Majesty's Theatre			Passages and doorways leading from all parts of house (except amphitheatre) to bars and saloons—no fire-proof doors
Gaiety Theatre	..	Openings in wall which separates adjoining temporary building (used as property-room and scene-dock) with light wood doors covered with sheet-iron—very primitive method	
Standard Theatre	...	Scene-dock and property-room in temporary building, with openings formed in back wall at back of stage; openings not enclosed with doors	
Opera House		Certain doors (in stalls and pit) made portable, and are removed during entertainment

The use of the hand-rails will be of assistance not only in cases of tripping and of falling, but also in being the means whereby the people in front will be able to withstand a too precipitate rush of those behind; the dividing hand-rail on the stairs of 6 feet width and upwards answers a similar purpose in breaking the force of the crowd. Provided the angle be not too steep, long, straight stairs are on the whole preferable to short, steep stairs with intervening landings, such stages only acting as blocks to the stream of people flowing in and out. Let A and B, Fig. 1, represent the two extremities of a passage-way, A being the exit on to the open thoroughfare, and (B) the door-

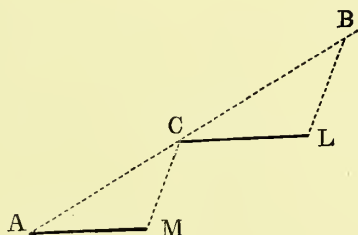


Fig. 1.

way on to the auditorium, whence people are emerging; CL and AM will be landing-stages, BCA, BL and CM are stairs. Now, in a general way, it will take one set of people a shorter time to reach c from B along BC than it will take another set along the longer route BL, LC. Hence, the objection to landing-stages, so far as regards time occupied in clearing. Again, BL, LC, being the longer route, will accommodate a larger number of people than BC in the scrimmage to get out, and thus, when each individual happens to arrive at c he will have a proportionately heavier task to prevent himself being thrust headlong down the next flight of stairs; each successive arrival at this same point experiences the increased pressure, and unconsciously slackens speed, with the result that at the free edge of every landing there is a stoppage—the second objection to staircases built on

this plan. It is important that the width, whatever it may be, of any stair, after being once fixed, should be uniform throughout that stair; it is on no account to be reduced by the erection of a ticket-office, ventilating-flue, or other contrivance, which only act as blocks to the passage-way. The necessity for making a large limit to the height at which the stair is to be roofed is rendered imperative by fatal cases reported, where a deficiency in this respect has formed an obstruction to exit among a panic-stricken audience,* or else been the cause of the lighting arrangements being tampered with; for by a suitably high roof the illuminants can be kept well out of the way of interference, either intentional or accidental.

The total superficial area of the stairs, landings, and passages will of course always bear a large ratio to the superficial area of the building itself, and could well be fixed at a minimum of 1 to 4. The average of five Sydney theatres (see Table of Stairs) is 1 to 3·6. Stairs only for use in case of panic, fire, special exit, etc., and so labelled, are useless anomalies—people under the circumstances invariably rush to the doors whereby they entered, and not to those which, in case of emergency, are provided for them.

All *entrances* should be sufficiently protected from the inclemencies of the weather. This rule, perhaps, is not so applicable to this city as it is to those localities which have a marked rainy season, and where the state of the air within the building is not of such perfect quality as to render any extra vitiation due to the emanation from damp clothes immaterial.

The entrances, but most certainly the *exits*, from the more expensive portions of the building to be situated in the narrower thoroughfares, and those from the cheaper parts in the wider one. The end in view of this arrangement is to lessen the magnitude of the crowd congregating; for instance, during ingress or egress there will be a comparatively larger number of

* As at the Exeter (England) Theatre fire, where, on one point of the exit gallery stairs, the roof was stated to be but 4 ft. high.

STAIRS, ETC.

Theatre.	Nature and Materials.	Remarks.	Total superficial area of stairs, landings, passages.	Superficial area of building.	Giving a ratio of
Her Majesty's Theatre ...	Winding stairs from family-circle and third gallery	The latter is dangerous in case of panic	1416	(140 × 58) 8120	1 : 5·7
Theatre Royal	Stairs and landings are all of pine				
Criterion Theatre ...	Of fire-proof materials; wooden stairs from second gallery	Stairs from second gallery reduced at landings to 3 ft. 6 in. and 2 ft. 6 in.			
Opera House	All floors, stairs, and landings of pine; stairs from balcony remarkable for lightness of construction	Entrance stair to stalls and pit contracted from 4 ft. 6 in. to 3 ft. 4 in. by ticket-office.* No hand-rail on escape-stair from stalls and pit. Stairs from various portions of the house are insufficient and dangerous	1513	(90 × 53) 4770	1 : 3·1
Gaiety Theatre ...	All floors, stairs, landings, and ceiling of auditorium of pine	Exit doors from orchestra-stairs with doors folding inwards	1711	(100 × 41) 4100	1 : 2·3
Standard Theatre ...	Stairs and landings of pine		1488	(96 × 36) 3456	1 : 2·9
Alhambra Music Hall	Stairs of pine	Exit gallery stairs inadequate and very dangerous	998	(82 × 40) 3280	1 : 3·2

* This office has since been removed.

people collected outside the pit or gallery-doors than there would be at the stall or box entrances.

All *doors* and *barriers* to be made to open outwards, without locks, bolts, or bars. Exits, entrances, and doors, in all cases to be as wide as the stairs leading to them (C.S.T.). Should a door *not* lead to the way out, there must be painted upon it, in conspicuous characters, the particular part of the theatre, refreshment-rooms, smoking lounge, etc., to which it does lead.

The public must be taught that one and every door, unless otherwise so stated, opens to the 'way out.' The very simplicity of the method recommends itself.

It is of course understood that where, owing to their contents, or the purpose for which they are used, certain portions of the building, such as the scene-dock, property-room, etc., have to be kept separate by walls of brick and fireproof construction, the intervening doors will also be rendered fireproof.

In all cases where a portion of the audience is to be accommodated over, or at a higher level than another, a separate means of exit, of the width above prescribed for staircases, internal corridors, or passage-ways, and communicating [*per se*] directly with the street, is to be provided for each floor or level (separate tiers of boxes for this purpose to be reckoned together as forming one floor or level). One additional exit at least, communicating with the different levels, and opening directly into the street, is also to be provided (M.B.W.). It must not be supposed that so long as there is a door leading on to another exit it is an extra exit; for 'by this rule a private house with sixteen rooms, to each of which there was a door, might be said to have seventeen exits, although there was only one front door to escape by. This is obviously absurd; for it is clear that there is no safety till the open street is reached. An exit means a separate exit on to the street.*' Width of the exits to be such that the number of people per foot of opening is not over fifty.

Immediately after ingress, throughout the whole length of

* *Saturday Review*, 1887, p. 325.

the performance, and during egress, stringent measures to be taken to keep the footpath at the entrances clear of obstruction, at least in so far that the departing audience may be kept 'on the move.' It will be remembered that the terrible loss of life at the Ring Theatre in Vienna was due, not so much to the blocking up of the staircases and corridors, as to the cumulative wedging in of the victims at the entrance doors by the external crush.

It ought certainly to be possible for the theatre to be cleared of the audience well within three minutes of the falling of the curtain. The true disposition of a theatre is for the *stalls* to be 'placed slightly below the stage, but ascending to the back, and the first tier of boxes to be almost on a level with the stage. This arrangement necessarily excludes the burrowing under the boxes to find space for a pit; the actor's voices are lost in these cavernous recesses.'*

From the following table it will be seen that the Sydney theatres compare favourably with buildings elsewhere, both in average of number of people per foot of opening, and in time of clearing audience.

All *seats* to be fixed, the backs to be placed at least 2 feet 6 inches apart between the rows, and the space assigned to each person in each portion of the house to be not less than 1 foot 8 inches by 2 feet 4 inches. The fact of the seats being firmly secured serves the double object of preventing them being broken away in case of panic, riot, or other disturbance, and at the same time ensures that the gangways will be kept clear as far as the seats are concerned. The only situations where this rule might be relaxed is in the private boxes, should such portions of the theatre be retained. The minimum superficial area of 20 × 28 inches assignable to every occupant is determined on rational, and not empirical principles, in that the normal width of the human frame at the shoulders is under 20 inches, and the normal length of the thigh well under 24,

* P. Fitzgerald, 'Scenic Illusion and Stage Appliances,' *Journal, Society of Arts*, 1887.

EXITS.

Theatre.	If exit to more than one thoroughfare.	Outside Exits.	Maximum No. of people assembling.	Width of doors at street all told.	No. of people per foot of opening.	Time occupied in clearing.	Remarks.
Theatre Royal	King Street, Castle-reagh Street, and right of way	7	1700	34 ft. 8 in.	50	3 m. 37 sec.	No portion of this house is fireproof; if a fire takes place a few seconds only can elapse until all will be in flames
Gaiety Theatre	Not for audience. Actors can get through lane adjoining	3	800	10 ft. 8 in.	75	4 m. 55 sec.*	Originally erected for Hall for Society of Guilds, with level floor and no stage
Standard Theatre	No	4	1150	19 ft. 4 in.	60	2 m. 19 sec.	Originally built for a Royal Foresters Hall
Opera House	York Street, King Street		1100	30 ft.	37	4 m. 45 sec.	On first floor; rows of shops occupies ground floor. Designed originally for a Music Hall
Alhambra Music Hall	George Street and right of way (to same street)		650†	24 ft. 3 in.	27	2 m. 47 sec.	Originally built for a Bazaar or Auction Room
Academy of Music‡			750	10 ft.	75	1 m. 45 sec.†	Built for and used as a billiard-room

* When there were but 400 people present.

† Though there is seating accommodation for 894.

‡ When 587 people present.

‡ Lately the Victoria Hall.

the remaining 4 inches being required for the projecting feet and toes. The inconveniences that arise under present circumstances from too small a seating-space are well portrayed in the following sketch, Fig. 2, taken from nature; it represents an individual in the cheaper portion of a well-known theatre, where the short distances between the backs of the seats necessitates the cramped position indicated, the pressure of the crowd laterally not ad-

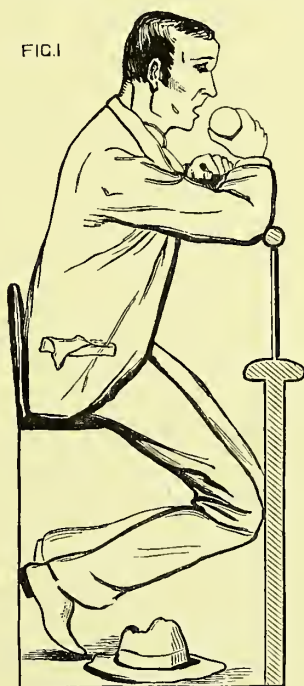


Fig. 2.

mitting of the sitting posture sideways. Probably the only mementoes of the evening's entertainment that this visitor will take home with him will be a pair of stiff arms and legs, an aching back, sore knees, cramped toes, a worse temper, and a smashed-up hat.

This space of (20 × 28 inches) 3·8 square feet is sufficiently

adequate for the occupant, provided that it is not used as a passage or gangway by his neighbours in getting to, or from, their seats, a purpose, however, to which it must be put under the customary yet faulty method of placing the seats side by side in long rows parallel to the stage front. This is only too evident in the event of people coming later than others to a performance, a possible instance of which can be depicted in our mind's eye; the unwelcome intruder, in endeavouring to squeeze a way through, is in the act of treading on the favourite corn of the person behind, and sticking his elbows into the head of the lady in front—a performance which may be repeated *ad libitum* until he succeeds in finding his place. The reason of having the backs of the seats at least 2 feet 6 inches apart between the rows will now be readily intelligible.

On the other hand, I have proposed a wholesale reform in

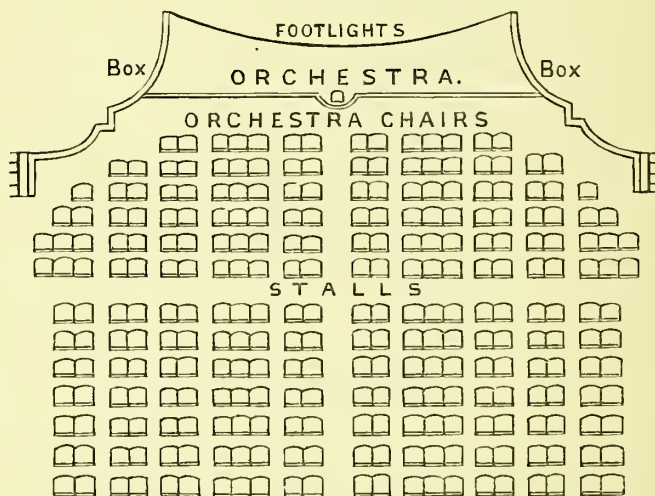


Fig. 3.

the matter of seating accommodation, an explanation of which will probably be made clear by attention to the following diagram: Fig. 3. By this system all the seats are placed either

in single, double, or even treble file, vertically to the proscenium, with gangways intervening ; thus, people may come out and in without inconveniencing either themselves or others who may be already seated.

The number of seats to be limited, and no standing-room allowed. It must be distinctly understood that when once a building has been constructed to accommodate a certain number of occupants, any excess of that number is on no account whatever to be tolerated. A building is intended to hold a certain number of people : the fittings, appliances, means of escape, amount of water in case of fire, etc., are all based and calculated on that number, and will naturally prove deficient and faulty supposing it to be exceeded.

A clear passage or gangway, of not less than 3 feet wide, to be reserved round every part apportioned to the audience except that next the proscenium or place of performance [and in the first rows of the various tiers] (M.B.W.).

With regard to private boxes, there is every probability of these structures soon becoming curiosities of the past. As unnecessary as it is uncomfortable, an ordinarily constructed box intended for 4, 6, or perhaps more occupants, doubtfully proves sufficient or comfortable enough for one : on the understanding, of course, that the visitors in this portion of the house have come to see what is to be represented upon the stage. Fig. 4 gives a sketch of some fair occupant in the customary private box. To the public gaze she probably appears as the charming reality of some delightful dream, *i.e.*, as much as is seen of her ; but fortunately I have been favoured with a private view, and this is what rewarded my curiosity. Owing to the vertical construction of the box front, and the deceptive step in the box-floor, the lady in question is prevented bringing her chair sufficiently forward, or pushing it correspondingly backwards, and tucking her feet up comfortably.

The omission of the customary fan and opera-glass in the picture suggests their having perchance rolled over the arm-rest on to the head of some unfortunate victim below—an

accident of not uncommon occurrence: a safeguard can be furnished by providing the front rail of the boxes, etc., with turned-up edges.



Fig. 4.

As one of the devices resorted to for economising space, it was mentioned that the *orchestra* was occasionally placed underneath the stage. An objection to this arrangement, however, in addition to its faultiness from a healthy point of view, is that the musicians can now only and solely follow the beat of their conductor, and not at the same time the expression and 'tip' of the actor, who, having therefore most stringently to follow his lines, is prevented 'giving effect,' an obvious drawback in operatic singing.*

* A rather fantastic arrangement is that at the Lyceum, in New York, 'where the orchestra gallery is suspended in the air, between the drop-scene and the curtain, and, when its function is over, is drawn up into the clouds.' P. Fitzgerald, *op. cit.*

SEATING ACCOMMODATION AND GANGWAYS.

Theatre.	Seated for	Max. No. Assembling.	Excess.	Remarks on Seats.	Remarks on Gangways.
Theatre Royal	1441	1700*	259	Fixed chairs in stalls	Insufficient in the stalls
Standard Theatre	960	1150	190		
Alhambra Mus. Hall	894	650	Deficit †	Fold - up - bottom chairs in dress-circle, 2 ft. 2 in. from back to back. Fixed forms without backs in gallery	Insufficient in stalls. Insufficient in dress-circle, and absent on the side next the escape-door
Gaiety Theatre	600	800	200		
Her Majesty's Theatre				Iron fold-up-bottom chairs. In third gallery, benches raised one above the other, 2 ft. back to back	Insufficient in orchestra-stalls and pit

* But has held as large a number as 2330, or 889 more than it should.

† This is easily accounted for when it is borne in mind that the seats along the division wall of the dress-circle are but 15 in. wide, that the fixed forms, without backs, of the stalls and gallery seat 340 and 320 instead of 240 and 135 respectively, and that there are 234 instead of 147 seats in the dress-circle.

Retiring and cloak-rooms, water-closets, and urinals to be provided, but in open spaces, detached and well-ventilated, and lighted with windows to the open air (C.T.S.).

Inadequate provision in the way of latrines, etc., is, indeed, remarkable, and, when they are present, their construction and ventilation are often of so primitive a character that the olfactory organs serve as the best guide to their whereabouts. So well ventilated ought they to be that not even the presence of carbolic acid or other disinfectants should be detected, and far less should the foul air from such place be carried into the auditorium.

Criterion Theatre ...	Gentlemen's lavatories in dress circle, and lavatories in family circle, not well ventilated, smell of carbolic and disinfectants. Vitiating air from urinals and closets carried into auditorium
Opera House ...	W.c.'s and urinals on ground-floor, and under the stairs : defective, little or no ventilation

All *floor and stair coverings* to be kept in good condition and well laid, so as to prevent people tripping up. Carpet and matting are excellent materials for deadening sound, such as scraping of the feet, etc., but unfortunately are equally perfect in collecting dust; hence, unless thoroughly well and regularly cleaned, should be discarded. The bare boards polished would be too slippery and prolific of accident; if simply painted, the pigment would have to be continually renovated. On the whole, some such material as linoleum, or other oil-cloth, appears to answer the purpose well.

All *dressing-rooms, green-room, etc.*, to be well furnished, lighted and ventilated, with provision for the proper separation of the sexes; these rooms to be sufficient in number and size, and in direct communication from under the stage and orchestra with the open air. Proper provision to be made in the matter of water-closets, urinals, retiring-rooms, baths, etc., for use of the persons employed on the stage (C.S.T.). Not to be constructed in the auditorium.

Actors often have the most abominable rooms to dress in—a small room with one window, if any at all, sometimes no light whatever except gas, and a door perhaps facing the wings, whence the abnormally vitiated and heated air from the stage and body of the theatre rushes in with full force each time the door is opened. In some cases the dressing-room is situated underground, in others it is placed high up above the stage, with an atmosphere even fouler than it would be lower down, and rendering escape, in case of fire arising below, well-nigh impossible. Even the means of washing, etc., are sometimes totally inadequate.

Ventilation to be adequately provided for by mechanical means—that of auditorium and stage to be separate. The ill-ventilated condition of several of our play-houses is notorious: the stifling temperature in the gallery, the lethal oppressiveness in the pit, and the disturbing general atmospheric influences in other portions of the building, are often matter of serious consideration to the playgoer when making choice of an evening's entertain-

DRESSING-ROOMS.

THEATRE.	WHERE SITUATE.	CONSTRUCTION.	MEANS OF ESCAPE.	REMARKS.
Her Majesty's Theatre	Outside main walls on either side of stage	Of three floors	First floor to street; second and third floor reached by winding wood staircase—could not escape if fire or smoke entered stair	All good and well-ventilated
Theatre Royal	Outside	Temporary—wood and corrugated iron	Two escape doors	Lighted from roof by skylights and through windows in outer walls
Criterion Theatre	In basement, under auditorium	Divided from each other by wood partitions, alley - way encircling them. Five w.c.'s and three urinals here		No light to the rooms except gas. Very defective ventilation. Disagreeable smell pervades whole area. Recommendations for improvement here made by the Commissioners completely ignored
Standard Theatre	Outside main wall at back of stage		By stall entrance, same as the public	Light and ventilation obstructed by a temporary building used for scene-dock and property-room
Opera House	Within main walls at side of stage and back of boxes	Of temporary character, as also are the stairs leading to them	In case of fire on stage, escape impossible	
Gaiety Theatre	Outside main buildings, detached	Old dwellings	Separate exit to street	
Alhambra Music Hall	Outside main buildings, detached	Row of stone cottages	Separate exit to street	

ment. In England there are many people with rooted objections to attending an evening performance on a day when there has been a previous afternoon one ; a similar principle underlies their rigorous dislike to being present on a Saturday night, when especially, of all days in the week, the atmosphere is unusually vitiated from the previous five nights' continual run, unless stringent preventive measures be taken by the management. This keen appreciation of good and bad air is, of course, more affected by some than by others, yet I myself have met with cases where people, owing to the imperfect removal of the air from the preceding night, are prevented attending morning performances at all, except at the cost of a headache or other troubles, while they are able to sit through an evening's entertainment with impunity.

But the fact must not be overlooked that the performers themselves are often, and perhaps as constantly, labouring under similar, and probably greater, disadvantages. The actor, as soon as he makes his appearance, 'is enveloped in the various odours of oil, turpentine, and other delights of stage-preparations. At the rising of the curtain, owing to draughts created by the intense heat of the footlights, and masses of light burning at the wings and borders, he is greeted with the whole air of the auditorium and its 'orange-peppermint' accompaniments ; and, with the progress of the evening, owing specially to changes in the rarefaction of the air, combined with other causes, he is obliged to make use of far greater exertion in making himself heard towards the close of a performance than was necessary at its commencement.'*

The position of the exits for vitiated air varies a good deal. Sometimes they are placed at the back of the stage or through the wings—often the exit is at no higher level than that of the dressing-rooms, which accordingly get filled with bad air.

The ordinary funnel-shaped ventilators in the dome, worked by a ring of gas-jets, are not always efficient, for the heat of the central burners often overflows the opening and returns to the

* *Stage, op. cit.*

room. Similarly in the case of flues, which, though perhaps well adapted by mechanical means for drawing off any vitiated air, are often put up in a building without any compensatory arrangement for the admission of pure air, except by doors and windows. Louvres are used in some of the theatres here, but unless specially constructed are apt to let in the rain and permit down-draughts.

Physiologists tell us that 750 or 1000 cubic feet is the minimum space required for each individual, in order that the air may be kept in a salubrious condition, and even then it must be changed three or four times an hour, and the best machinery employed to effect such change so that no draughts are felt. By means of some tables drawn up from official data, I have calculated within wide margins the number of cubic feet in each theatre for every person therein assembled: no wonder the buildings are described as 'very defective,' etc.

It is by tables such as these that the number of occupants of a theatre should be regulated, when the seating accommodation is being determined.

It will easily be understood that the demonstration of existing defects is a matter of far less difficulty than suggesting the best means for remedying them—a difficulty all the more increased when it is remembered that no reliable experiments have ever been instituted for the purpose of discovering in what, and in how many, directions the vitiated atmosphere is at fault.

Many and various are the systems which have been proposed for ventilating the play-house or music-hall—one of the latest, and one which is certain to take its rank among the best, is that which has been patented by D. C. Green, and already put into working order at the Gaiety Theatre, London, where, as far as I am aware, it has acted admirably. It is worked with compressed air in the following manner: An air-compressor is placed in any convenient position adjoining the building, supplying air at from 3 to 5 lbs. pressure per square inch. The compressed air is then conveyed in small pipes to peculiarly constructed

VENTILATION.

Theatre.	Means adopted on Auditorium.	Remarks.	Maximum No. of people attending.	Cubical capacity of building. L. W. H.	No. of cubic feet each person.
Theatre Royal	Louvre windows, openings in floors, and three 12 in. pipes leading up above chandelier through roof*	Very defective	1700	140 38 48 389,760	229
Gaiety	Windows, 6-in. space between ceiling and walls, openings in ceilings, and iron pipes above chandelier	Good	800	100 41 30 123,000	153.5
Alhambra Music Hall	Lantern in roof, open cast-iron and wood lattices over doors and in openings	Stalls very badly ventilated	650†	82 40 32 104,960	161.5
Opera House	Flues and openings in walls. Large pivot-hung sashes at back of room-windows; two large openings in ceiling. Lantern roof with 6-in. space	Very defective in lower portion of house, especially the pit	1100	90 53 35 166,950	151.7
Standard Theatre	Windows (and flues?)—no other means provided		1150	96 36 30 103,680	90.1
Criterion Theatre	Three 'Eolus' spray machines in rooms of basement. Vitiated air is drawn from basement and distributed over stalls and dress-circle. Vitiated air from urinals and closets carried into auditorium‡	Very defective			

* In the roof over stage there are no openings, louvred or otherwise, for escape of smoke, etc.

† Though 894 is the number of seats provided.

‡ In the stage portion is a large skylight with louvre openings, which are of little value.

nozzles, which are fixed at different points near to or where the ventilation is required. The air issues from these nozzles into a specially-shaped pipe or orifice, causing a large secondary or induced current to flow through the orifice from the external air. The secondary current is some twenty or thirty times greater in volume than the amount of air issuing from the nozzles, can be drawn from any distance, and can be cooled if necessary before delivery. The pipes conveying the compressed air are merely ordinary gas pipes. To exhaust foul air, the nozzles have simply to be reversed.

It seems strange that with the good results obtained by constructing the *roof on the sliding principle*, as adopted at the Hippodrome in Paris, the Pavilion and Canterbury in London, such method has not come into use here in Sydney where the climatic conditions are incomparably superior.

The store of the *illuminant*, gas-meter, dynamo, etc., to be outside the main walls of the building. Lighting of stage and auditorium to be separate.

There is a remarkable tendency in the modern theatre to bathe both stage and auditorium in a mass of glaring light. On the stage there is certainly much too much of it: in the old days the greater portion of the stage was thrown into obscurity, the lights being directed on the performers, an arrangement which rendered the scenic illusion still more complete. For in everyday life, when witnessing any passing circumstance or event, what we are most struck with is not the surroundings, but the individuals engaged. In the auditorium, again, the flood of light from the central chandelier, though defended on the ground of assisting in the expulsion of vitiated air, is no small annoyance to the people in the upper tiers and gallery.

Of *illuminants*, there can be no doubt as to the expediency, from a health point of view, of resorting to electricity as the very best; but until its initial cost and efficient maintenance can be guaranteed as less costly than it is at present, I can hardly hope to welcome its early introduction except into the more fashionable houses.

At present the heated atmosphere and noxious products of combustion are strong objections to the use of gas. GAS FOOTLIGHTS are a terrible ordeal to the poor actor; unless well accustomed to them, his eyes are worried with the flickering glare, and his throat often parched up, at a distance of some feet even, by the oppressive heat and combustion-products arising; in addition, the various vapours resulting produce such rarefaction as to render it necessary for his voice to be considerably raised.

All lights to be protected with glass shades covered with wire-work. All gas-pipes to be made of iron or brass, and to be laid in the walls, not external to them. The necessity of this method of fixing the gas-pipes is well illustrated by the fatal panic at Spitalfields (London),* the prime cause of which disaster appears to have been the knocking down of such a gas-pipe affixed to the wall. In illustration of this regulation, there is a grim satisfaction in knowing that at the Opera House in Sydney the tubing connecting the gas-lights on the flies is of rubber, and, what is more to the point, I learn that it is decayed and dangerous!

Oil lamps or candles, especially in the passage-ways and corridors, are to be provided and always kept lighted, in case of extinction of the gas or failure of the electric current.

Warming apparatus it is needless to discuss. The play-house is speedily and generally sufficiently warmed on ingress of the spectators. In London, where the theatre is warmed artificially, hot water only, and that at low pressure, is allowed.

A very common complaint, and one not at all easy to remedy, is the defective transmission of *sound* so often experienced. In defence, it may be urged that the acoustic principles (except the most fundamental), in so far as they are applicable to the play-house and concert-room, have never received the necessary attention at the hands of any authority sufficient to warrant their introduction into the plans. It is rather hard on the performers to have to speak their parts with greater exertion

* *Pall Mall Gazette*, Feb. 4, 1887.

LIGHTING.

Theatre.	Method Employed.	Position of Source.	Remarks.
Her Majesty's Theatre	Electric light - - 'Roby's Portable',	Outside main walls; in basement under dressing-rooms	Floors of dressing-room above not rendered fireproof, but distant from engine 12 or 14 feet
	Gas—three meters	Inside main building	Not easy of access, and where there is not the slightest ventilation; dangerous in case of fire
Theatre Royal	Electric light Gas—three meters	In adjoining building Underneath manager's box	One to large chandelier in auditorium; one to footlights, stage and dressing-rooms; one to rest of auditorium
Criterion Theatre	Gas	Meters (with tanks for oxygen) in basement under auditorium	Where there is neither daylight nor ventilation
Gaiety Theatre	Gas—five meters	In main building, under stairs leading to balcony	
Opera House	Gas—two meters (one for stage; one for auditorium)	Under rear of stage	Rubber tubing connecting gaslights on the flies decayed and dangerous. Footlights on stage very improperly protected
Alhambra Music Hall	Gas—two meters	In recess, under stage, which is locked	Beside it are three buckets of water, which could not be got if wanted; six oil-lamps on walls of auditorium
Standard Theatre	Gas		Oil-lamps in all parts of the house

than necessary, and equally distasteful for the public to be keeping their hearing continuously strained, the necessity thus arises for adopting measures separately applicable to the stage and to the auditorium. Acoustic effects fortunately are incomparably augmented by building the stage-flooring over a huge chamber, somewhat on the type of a sounding box, provided that this space is unoccupied and not filled up with rubbish, etc. (see Table of Stage). In the auditorium thick draperies without doubt form the best decorative materials for the back and sides. The numerous echoes that would necessarily arise militate against the substitution of the bare walls. The performers, and singers especially, would be grateful for any methods of lightening their labours; singing 'flat,' for instance, is more often the fault of the building than of the singer. Gas footlights are said to interfere with the proper transmission of sound. In those rare cases where the structural design admits of too marked and unpleasant an augmentation of sound, a successful remedy is stated to have been found by fixing wires across the upper internal portions of the edifice.

STAGE.

Criterion Theatre	Egress very defective. Basement under stage, with scene-pit, lumbered up with property, sent down through the traps on stage-floor. Orchestra under front of stage.
The Standard	Area under stage at present filled with rubbish, and has no ventilation; stifling and dangerous to health. Carpenter's shop under stage. Stage and all connections are of inflammable materials.
Opera House	Accumulation of rubbish on the flies (and over portion of ceiling of auditorium).
Gaiety Theatre	Area under stage excavated to a depth of eight feet from under side of stage-floor, formed of tar-paving. At present it is all clear of rubbish.

Treating now of the subject of *fires* in theatres, it will be convenient to discuss the matter under the following heads: the possible causes, the hindrances to a conflagration spreading, the mechanical means and method to be used for its extinction, and the prevention of resulting panic and loss of life.

Attention has already been drawn to the frequency with which the stage—and its connections (store and property-room, workshop, etc.)—proves itself the source of danger, and to the very necessary provision of rendering this portion of the building fireproof. Uninflammability should be the order of the day for all decorative work, both in front and behind the scenes. Of course, the most radical measure for the prevention of accidents is to prevent the fire originating at all, by insisting on everything, including building-materials, furniture, fittings, decorations, scenery, and costumes, being either incombustible naturally, or rendered fireproof artificially. All woodwork could easily thus be made safe by the use of different chemical agencies, and similar measures might without detriment be taken with the various draperies, hangings, curtains, seat-coverings, etc. One authority proposes that the cushions and seats should be made soft with steel springs, or stuffed with the fibrous material made out of iron slag, and known as silica cotton. It has even been suggested, and the suggestion is well worth considering, to compel performers to wear fireproof dress materials.

The representation of a fire-scene, or display upon the stage, has more than once been the cause of a conflagration in the building itself, owing to the lighted sparks flying off on to some combustible material in its neighbourhood. Coloured lights for these displays were some years ago obtained by means of strontium and potassium salts, but so dangerous did they prove, that they were soon discarded, and, as far as I am aware, are now practically obsolete. On the modern stages, the same effects are produced by a far less hazardous method of burning some lycopodium powder in an open pan, and throwing a strong light through variously coloured glasses on to the white, cloudy smoke so produced. Still more recently, the use of steam has been brought into requisition in place of the lycopodium. Again, there are several instances recorded where explosion with resulting fire has occurred from the faulty mixture of the gases in the oxy-hydrogen light apparatus—an

apparatus which on no account should ever be allowed in the hands of any other than those of a skilled workman. Electricity again may not always be employed with the impunity which at first sight might be expected. In one of the new continental theatres last year, just before completion, a fire broke out underneath the stage portion, owing to heating of the conducting wire, in which there was a flaw, which wire was placed in too close a proximity to the inflammable woodwork. Though these examples are but a few out of many, they will serve to show in a general way from how many and various causes danger is to be apprehended.

Among other hindrances to the spread of conflagration, I have already urged the necessity of fire-proof walls and doorways ; the burning mass thus encompassed could soon admit of being mastered. First and foremost of these fire-resisting obstacles would be the proscenium wall and curtain to which attention has already been drawn.

The mechanical means for extinction of fires consist of fire-mains on constant supply, cisterns or tanks in connection with hydrants, wet blankets, buckets, hand grenades, etc. As there is not enough pressure in the mains here in Sydney, cisterns should be provided containing at least 250 gallons of water for every 100 persons in the audience to be accommodated in the building. These cisterns to be placed on the top of the proscenium wall or on the top of the outer walls of the staircases : indeed, in those situations where, in case of fire, they would be furthest removed from accident, and perfectly free to act. They may not prove of much value when placed up in an attic or on a grid-floor, for the reason that, with the destruction of the wooden supports on which they are resting, they would probably speedily be overturned. Fire-mains to be connected with these cisterns and extend round the whole circuit of the building, and be fitted with hydrants in such places and manner as may be approved and decided upon. The water in these tanks, as well as in the fire buckets, being solely for use in the extinction of fire, should not be made subservient to any other purpose whatever : the water must be there when wanted. Wet

WATER SUPPLY.

Theatre.	Source of Water.	Situation.	Remarks.	Maximum No. of People.	No. of Gallons per 100 People.
Her Majesty's Theatre	Six 400-gallon tanks	Above stage, up on grid-floor		1511	159
Theatre Royal	One 200-gallon; one 400-gallon tank Hydrants	Above stage Yard, in front of stage, in auditorium against side-wall	Fire-buckets ready for use in various parts of building*	1700	35
Opera House	Two 400-gallon tanks	In attic of roof		1100	72
Alhambra Music Hall	No tanks for supply of water—only a small one for use in dressing-room Hydrant	On stage			
Standard Theatre	No tank on roof Hydrants	On stage, gallery, stalls, and at back of dress-circle	Fire - buckets in various parts of house		
Gaiety Theatre	Hydrants	On stage, auditorium	Good supply of fire-buckets in all parts of building		

* No portion of this house is fireproof; if a fire takes place a few seconds only can pass before all will be in flames.

blankets, held in readiness at the back of the stage, are of great value in case of accidents through dresses, etc., catching fire. The next essential is that there must be persons responsible for the efficiency and proper working of the above apparatus when required. The theatre employés, and other volunteers, are generally objected to on the score that under the influence of a rush or panic they would look after their own safety and participate in the general flight: again, the fact of the theatre employés always being changed militates strongly against their employment in this kind of work. On the other hand, permanent firemen should be appointed, as in London, two, at least, to remain in the theatre while the performance is going on, and one to be on duty all the remaining time: these men to be provided by the play-house and music-hall proprietors, but to be under the direct control of the superintendent of the City Fire Brigades. It will be the business and duty of these individuals, who will be regularly drilled, to see that all the hydrants, tubing, etc., are in thorough working order and repair, and, when necessary, to communicate with the central fire-station by telegraphic alarms: all 'they would have to do would be to touch a knob, and the alarm would be received in the station . . . whereas, if you have a telephone, the probability is that the man would be too excited to send a message at all.'

Unfortunately, however, the experience of theatre-conflagrations has been to show that human agency, no matter how well organized, cannot be implicitly depended upon. 'The London Alhambra was lost . . . by the fireman attending a supper given by the performers after the theatre was over. When he was called, instead of staying to put the fire out, he saw to his wife and family, who lived in the front, and during that time the place was burning down.' At the Paris Opéra Comique disaster, on the memorable night in question, the iron drop-curtain was never lowered, and though there were certainly water-pipes in the building, not a drop of water was directed on the flames till half an hour after the alarm.

Such being the case, we must look round for some apparatus that is independent of human assistance, that will always be ready, will never sleep, and will invariably act when required. The nearest approach that has as yet been made to perfection is the automatic method already generally introduced into the larger English warehouses, but up to the present, as far as I am aware, only into one English theatre. A modification of this system of fire-extinction for theatres has been patented by a Mr. Sinclair, whose invention, which I consider a most important one, may be shortly described as follows :

‘It consists,* First, of an independent water-supply from the water-mains in the street, or from a tank at the top of the building kept for fire-extinction only.

‘Secondly, of a system of pipes to lead the water from the main supply and placed at intervals of 10 feet across the ceiling; the leading pipe connecting the system with the mains is 4 inches in diameter, and the pipes running across the ceiling $1\frac{1}{4}$ inches to $1\frac{1}{2}$ inches.

‘Thirdly, of a series of “sprinkler heads,” about the size of an egg, screwed into the smaller pipes at intervals of ten feet, so that each sprinkler commands all fire within an area of 100 square feet on the floor.’ [Of course the sprinkler heads could be fixed on the walls, etc., in connection with leading pipe, where they would be equally efficient.] ‘These sprinklers consist of a plate and a deflector. The plate is kept in its place by means of bismuth solder. The deflector is for the purpose of breaking the column of water into spray, which falls in a dense shower over the flames. The supply of water is regulated by an automatic valve which moves the moment a sprinkler begins to act, and is in connection with a fire-alarm. Immediately the flames and heat ascend, the bismuth solder, which is set to melt at any fixed temperature, say 160° F., melts and liberates the plate on the sprinkler nearest the fire, the water in the pipes rushes after it, and falls upon the deflector with the force that is behind it;

* *Pall Mall Gazette*, June, 1887.

varying from say 10 lbs. to 50 lbs. The water is broken against the deflector, and falls in copious showers over the flames that are within the area of 100 square feet covered by the sprinklers. If the flames, by the rapidity of their movement, should get beyond that area, the next sprinkler is on the watch, and the moment it feels the heat its contents are poured on the flames; the result is that no fire can gain the mastery where it liberates sufficient of its natural enemy to extinguish the flames, and that is just what it does when the sprinklers are opened.' [I have since been informed by the agents that new sprinklers are being patented which would close automatically on the temperature of the burning materials decreasing.]

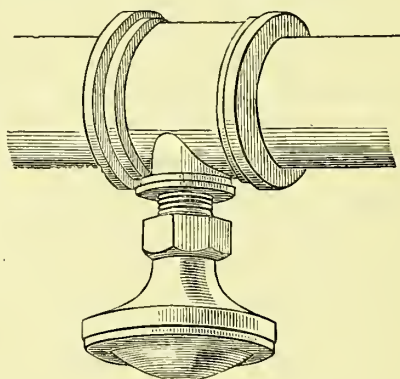


Fig. 5.

After any large conflagration in a theatre, with resulting loss of life, the papers are generally flooded with ideas and suggestions for prevention of a repetition in the future. Some of these correspondents apparently write in faith and sober earnest, though their suggestions are mostly puerile; a very good illustration in point, as typical of the remainder, is that of a Mr. Ash, evidently considered by the editor of the *Times* as worthy of insertion in that paper. The proposal is that, at a distance removed from the building, there should be a fire-guard room containing a series of pipes which, on the one hand, are con-

ducted into the theatre, passing over those portions especially menaced by danger from this source, and, on the other, are connected with the street hydrant by merely turning a stop-cock. 'A,' who is inside the theatre, if he has the necessary presence of mind, at the first alarm of fire sends certain simple and given signals to the guard-room to 'B,' who (dependent on 'C,' charged with the due maintenance and care of the street hydrant), by turning sundry handles, gets water delivered within the edifice the very moment when and at the very place where it is most needed. The safety of the public and performers undoubtedly depends on 'A.' If, now, we imagine 'A' carried along in the general stampede, and he forgets to or is prevented from signalling, 'B' is perfectly helpless; but if we can imagine the same 'A' keeping calm enough to send off certain signs, he must certainly find it a matter of equal facility to turn the handle—indeed, to do the same work as 'B,' but independently of him.

The prevention of a panic, it should be well borne in mind by the players, lies in great measure in their own hands—a fact the importance of which has already been recognised. Irving says that if ever a fire breaks out at the Lyceum during a performance, he means to go on acting, and play the people out. 'If actors run, the audience will, you may be sure.' With regard to the audience, it has been suggested that, to allay the public fears, it would be advisable for all the exits, hydrants, and other protective apparatus to be well exposed to view during the entr'actes: at the present time in some, I believe in all, of the German cities, the fireproof drop-curtain is lowered and raised again at the conclusion of every act.

A clever invention has been patented by Mr. Carson, the editor of the *Stage* newspaper, which, in case of fire or panic, should do much towards making an audience feel some degree of safety. By pressing a 'push' situated in any part of the building, a door, or the doors, are at once opened. . . . When the door is open, the current of electricity is automatically shunted into a call-bell placed just above the door: this rings so long as the 'push' is pressed, and calls attention to the means of exit.

A feature in the invention lies in the fact that only a weak current of electricity is necessary, so that the ordinary Leclanché cells now in use for bells and telephones may be called into service. This invention has the same objection, in common with others, that human agency is necessary to press the 'push.' Nevertheless, were this push to be worked in connection with the sprinklers above mentioned, nothing could possibly be better.

In connection with fire and panics, it may not be out of place to note what was contemplated in the new Flemish theatre in Brussels, now I believe completed. Here there is a system of external balconies or outer galleries, corresponding to those in the interior of the building, with which they communicate by no fewer than a hundred different doors—twenty-five to each tier. These balconies are further connected with each other by iron stairs of good width and easy descent, and the lowest of the four is capacious enough to give standing room to the entire audience.* It is these balconies to which I was referring when demonstrating the necessity of making the building open on all sides.

A fire at a theatre under certain circumstances does not necessarily mean such pecuniary loss to the management as might be supposed, for 'it would appear to follow, from the decision in *Taylor v. Caldwell*, that if a manager engaged performers to play at a particular theatre, and it was burnt down, the manager would not be held liable to the performers for salaries.†

Again, *Scott v. Howard*, where the question was raised as to certain rentallers claiming a right of free admission to a theatre that had been rebuilt subsequent to a fire, Lord Blackburn ruled that the shareholders would have a right of free admission to the theatre so long as that theatre continued to exist, and yet when that theatre was destroyed by fire, the right of free admission was gone—had perished with the theatre—and was

* *St. James's Gazette*, 1877 (up to Sept. 20).

† W. N. M. Geary, 'The Law of Theatres and Music Halls,' p. 62.

not revived when the new theatre was built in its place.* In London, fortunately, the fraudulent abuse of such contingencies is checked somewhat by sect. 2 of the regulations of the Metropolitan Board of Works, which requires that every person submitting drawings, plans, etc., of a proposed theatre, music-hall, etc., must make a statement as to the nature of his interest in the premises so proposed to be opened.

Many *accidents* arise in connection with defective stage-apparatus and appliances: so severe are these occurrences occasionally, that they lead to the permanent disablement of the sufferer, if, indeed, they do not prove fatal at once. Among such accidents may be mentioned the giving way of a trap-door or a rotten rope; this latter danger is especially likely to occur to performers on the flying-trapeze, rope-dancers, etc., and could always be prevented by careful examination previous to an entertainment. Similarly, the blankets or rope-netting used in connection with actors when throwing themselves over a bridge, etc., into the waters below, should all be carefully tested beforehand. 'Battles on the stage are common enough, and cannon and muskets are discharged with good effect, a sort of drawing-room cartridge made of phosphorus having been invented specially, which on explosion leaves no trace. Great caution, however, has to be observed in the use of fire-arms, and in the French theatres the ramrod is always fixed by a chain to the wall, as in the hurry it is often forgotten in the gun.'†

Thunder on the stage is represented by a truck laden with round shot wheeled along and which tilts over—it was less than a year ago that a stage employé in one of the English theatres was killed by one of these shots falling upon him. The oxy-hydrogen light has often proved dangerous owing to irregular mixture of the gases—I myself have collected particulars of five such cases within less than as many years. It will be recognised that many of these accidents in connection with stage-apparatus and of which the above will serve as typical examples, are in

* Geary, *op. cit.*, p. 77.

† P. Fitzgerald, *op. cit.*

a great measure preventible, and therefore ought to be as far as possible guarded against.

We go to the theatre and 'are prepared for realizing the semblance of life that is to be unfolded before us. We come knowing that what is to be performed aims at representing a real action or actual series of events. We not improbably work ourselves into a slightly excited state in anticipation of such a representation. More than this, as the play progresses, the realization of what has gone before produces a strong disposition to believe in the reality of what is to follow. And this effect is proportionate to the degree of coherence and continuity in the acting. In this way, there is a cumulative effect on the mind. If the action is good, the *illusion*, as every playgoer knows, is most complete towards the end. Were it not for all this previous mental preparation, the illusory character of the performance would be too patent to view, and our enjoyment would suffer. A man is often aware of this when coming into a theatre during the progress of a piece before his mind accommodates itself to the meaning of the play. And the same thing is recognisable in the fact that the frequenter of the theatre has his susceptibility to histrionic delusion increased by acquiring a habit of looking out for the meaning of a performance. Persons who first see a play, unless they be of exceptional imagination, and have thought much about the theatre—as Charlotte Brontë, for instance—hardly feel the illusion at all. At least, this is true of the opera, where the departure from reality is so striking that the impression can hardly fail to be a ludicrous one, till the habit of taking the performance for what it is intended to be is fully formed.* The conjuror is well aware of these preparatory mental phenomena, and turns them to profit. 'He tells his audience that he is about to do a certain thing; for example, take a number of small animals out of a box which is incapable of holding them. The hearers, intent on what has been said, vividly represent to themselves the action described. And in this way their attention becomes bribed, so as to speak, before-

* J. Sully, 'Illusions' (Int. Sc. Series), London, 1882.

hand, and fails to notice the inconspicuous movements which would at once clear up the mystery.* Managers would do well to take a lesson from the conjuror and make themselves acquainted with all those details which together tend to complete the illusion.

In the auditorium, scenic illusion is well-nigh impossible to a spectator, the martyr of a seat much too small to sit upon, a draught from some ill-fitting door presumably closed, playing the harbinger of a long doctor's bill, and an atmosphere of so stuffy and contaminated a nature as to threaten imminent suffocation, in addition to the several lesser evils existing on every side in an ill-constructed and badly-fitted place of entertainment. Sometimes the public have but themselves to blame, as when, during the progress of a performance, the inconvenience of a forgotten latch-key, a 'last train,' or perhaps a curtain-lecture is suddenly and only too painfully realized.

On the stage itself there is great room for improvement, so far as the scenic illusion is concerned, in connection with the footlights, the scenic apparatus, and the scene-shifting. Footlights might advantageously be abolished, and a reversion made to the old system of illuminating from above and from the sides—the natural order of things in every-day life. 'We are so accustomed to the lights being cast upward that we now cannot conceive them in any other position; yet the light being thrown downwards, as in real life, the unimportant legs being left in comparative shade, it must have had better effect. Everyone at the present time, sitting close under the stage and looking up at the actors, is struck by the unpleasant and unnatural look of the human face and figure divine seen under this illumination; for thus the forehead, top of nose, and lips are all in shadow; the teeth, instead of being shaded by the upper lip, come into full glare.† But if footlights be insisted on, they ought certainly to be sunk below the stage level, and thus rendered invisible to the audience.

* J. Sully, 'Illusions' (Int. Sc. Series), London, 1882, p. 106.

† P. Fitzgerald, *op. cit.*

The old system of flats, side-scenes, and borders, has of late years been tentatively replaced by elaborately built-up scenery, an unhappy innovation, in that the rules of perspective and distance cannot be properly carried out: 'indeed, it always seems that, in proportion as the scene appears of this solid character, it enfeebles the airy and romantic character of the play, having, as it does, no connection whatever with dramatic interest.* Change of scene ought certainly to be effected noiselessly, speedily, and in obscurity. The unnecessary glare of light in which the stage is bathed has already been alluded to. Among other conditions interfering with the illusion, and of which the reform lies in the hands of the management may be mentioned the following: The custom of pitching flowers on to the stage, or handing them over the footlights, the interruption to the action on the stage by artists advancing to the front to receive these demonstrations of the audience, and the disturbance consequent upon certain of the spectators entering after the commencement, or leaving before the completion, of an act. Nothing is more irksome than the delays which thus often occur in the most interesting part of a play: such practices should always be most rigorously prevented and suppressed.

As in all other walks of life, so here in the histrionic, the individual ultimately becomes more or less imbued with the ideas and sentiments peculiar to the exercise of his profession.† The rôle of self-deception which the actor, in the earnest fulfilment of his duties, has continually and repeatedly to play, without doubt exerts some deep and certainly recognisable changes in the moral tone and character—changes of which he is probably not so cognisant as are his friends and intimates. Habit soon becomes a second nature. 'The actor, though . . . he does not feel all the spectator is apt to attribute to him, tends, when vividly representing to himself a particular shade of feeling, to regard himself as actually feeling in this way. Thus it is said of Garrick that when acting Richard III. he felt him-

* P. Fitzgerald.

† On this subject see an article in *Longman's Magazine*, for January, 1888, on 'The Emotions of Actors,' etc.

self for the moment to be a villain.* ‘The late Mrs. Siddons was mentally Lady Macbeth from the moment when she stepped into her carriage at her own door till the curtain fell at her last scene, and she had resumed her private dress. She did not approve of any person intruding on her feelings and attention during the progress of the play, even between the acts. . . . One effect of the constant practice of players in calling up and exhibiting the natural language of the feelings is to render some faculties habitually prone to action in themselves in private life. The great tragedian, who may be said to wield a magician’s power over the propensities and sentiments of his audience by means of natural language, suffers in his own mind many tragic feelings from the trained activity of his organs. Many are irritable in consequence of the trained action of combativeness, destructiveness, and self-esteem—the stock elements of heroic and tragic characters. They are often melancholy and desponding from the trained action of cautiousness, which furnishes the perturbed and distracted countenance, the horror-stricken look, the shriek of despair, and sometimes the madness that petrify us when represented on the stage. The higher sentiments and intellect of the actor may govern his deportment in public, so that his general acquaintances may not observe these effects; but the close spectator recognises them, and the actor confesses and laments them to his bosom friend.’†

This moral influence of acting upon the actor has a very important bearing in connection with the employment of children on the stage. For, granted the possibility of certain significant changes arising in a nature fully matured, there is every prospect of these taking stronger and deeper root in a character still developing and adolescent. ‘Teach the child to exhibit the natural language of the faculty, and the very act of doing so will call up the emotion. If you find a child cross and ill-humoured, and you induce him to utter some kind speech to one of his com-

* J. Sully, ‘*Illusions*’ (Int. Sc. Series), London, 1882.

† Geo. Combe, ‘*Education : its Principle and Practice ;*’ edited by Wm. Jolly. London, 1879.

panions, expressive of benevolence, and to suit the action to the word—to smile and look benignant, and to use soft and tender tones—you will find that his crossness cannot co-exist with this effort, if successful. It arouses benevolence, and he becomes, for the moment, what he seems. If the action be often repeated, the emotion will become permanent.’* Recognising, therefore, how easily a child’s education might be tampered with, it becomes a momentous question whether juveniles should be permitted to undergo a histrionic training at all, and this quite independently of stage morality, etc. If the children are to be permitted, it would be well for the law to step in and enforce some form of apprenticeship which would ensure their being well cared for and looked after. Many a sad story could be told of the brutal and inhuman treatment that has been doled out to the young acrobat or tight-rope dancer, whose marvellous feats are possibly night after night drawing the acclamations of a crowded house, ignorant, alas, of all the pain and sorrow underlying the gloss and tinsel.

The only law, and that is in England, of which I am aware bearing directly on the employment of children in theatres is in connection with dangerous performances—42 and 43 Vict. c. 34, wherein it is made a punishable offence for any person, parent, or guardian, to cause any child under the age of 14 years to take part in any public exhibition or performance whereby in the opinion of a court of summary jurisdiction, the life or limbs of such child shall be endangered. It would be well for some such law to be enforced here—but applicable equally to adults as well as children. There is exactly the same skill in walking on a tight-rope three feet from the ground, as there is when the rope is fixed at thirty, with the addition that in case of a fall, it would be but trivial in the former case, possibly fatal in the latter. The morbid craving for such sensational displays ought certainly to be checked in the audience: if the management insist on having the rope fixed at a dangerous height, the law ought certainly to insist upon there being a network provided beneath. In a general way the

* Combe, *op. cit.*

health of an actor may be spoken of in very favourable terms. There is not too much, but yet quite sufficient study to keep his mind healthily occupied ; the amount of exercise, with rehearsals by day and performances by night, is quite ample to keep his physical powers actively engaged : while, what with a moderate amount of excitement, both are maintained in good repair by plenty of change in associations, ideas, and dress. Various circumstances stand in the way of careful and reliable inquiries being instituted as to any diseases or afflictions common amongst the profession : among other sources of information there would probably be a fruitful field of search in the books of the various English sick-fund, provident, and benefit societies. Mortality statistics are also difficult to get. Judging from the lives of some of our eminent actors and actresses, the practice of their art appears on the whole to have had little or no effect in curtailing the normal natural existence, though it is possible that, other things equal, the longevity may be ascribed to the constant mental application exercised. With regard to lung and throat affections in England, colds and catarrhs are more apt to occur in aspirants for honours on the music-hall boards than on the stage, a fact easily explained, in that the former are liable to far greater exposure from having to perform at sometimes three, or perhaps four, different music-halls during the course of an evening. As far as my limited experience goes there are no reported cases of the complaint popularly known as 'clergyman's throat' : an explanation of this is easy, when we bear in mind that whereas the parson usually harps more or less on the same note, which necessarily sooner or later becomes strained, the actor is continually employing a very varied series. Eyesight among actors is usually strong : the eyes can be long fixed without the slightest blinking. Short sight is exceptional, but this is only what we should have been led to expect from the very nature of the requirements of the profession. The different phenomena comprised under the term 'stage-fright' are far from being thoroughly understood, though possibly they are all explicable by sudden

want of confidence brought on by various causes : whereas in the olden days performers had often to be content with a day or two in getting up their parts, it is quite common nowadays, thanks to a plentiful market and long runs, for actors and actresses to have the full advantage of a four or five weeks' rehearsal. A statement having got current in one of the London dailies somewhat to the effect that 'long runs' were injurious to the mental condition of the performers, information on the subject was last year sought from certain 'stars' by the editor of the *Pall Mall Gazette*, in which the series of replies was afterwards published : unfortunately nothing of paramount importance was to be gleaned from the opinions expressed, save that, to put it shortly, long runs are bad for art but good for actors.

Change of dress, during the progress of the evening, is an excellent one from a hygienic point of view : as a rule, an actor generally manages two or three changes, each time feeling his body refreshed and spirits revived. With regard to attire itself, actresses in opera, especially those in the habit of tight lacing, must be little aware of the ugly figure they cut owing to the compression to which they subject themselves : this is an appearance 'especially striking in public singers, the style of whose dress renders the ordinary quiet mode of breathing impossible, and yet who have frequently to make use of long-continued and powerful currents of air.'* In the same way, fault may be found with the build of the men's collars, especially those of a pronounced 'masher' type, which, while at the same time producing a most ludicrous appearance in the wearer, prevent the full force of the respiratory organs being exerted. Passing from general make-up to dress material, we may mention that cases have been reported where the colouring matter of the stockings or 'tights' has exerted certain deleterious influences on the subjacent skin : such examples fortunately have been so few and far between that the publicity given to them when recognised will, it is to be hoped, prove a sufficient obstacle to

* V. Mayer, 'The Organs of Speech' (Int. Sc. Series), London, 1883.

their recurrence in the future. Happily, the employment of lead, mercury, bismuth or zinc in the manufacture of the various cosmetics and paints requisite for histrionic portraiture is every day becoming more and more obsolete.*

As to the question of *smoking* in theatres, the exigences of modern nature point to the early introduction of the fragrant weed within the precincts of the playhouse walls. We shall probably soon hear of non-smoking in contradistinction to smoking theatres. 'In England, the argument which is based upon the danger of fire would apply to the music-halls, and that there is little force in it, is proved by the fact that a good many years have gone by since a music-hall was burnt, and that in the matter of immunity from destruction in this way, the music-halls, where smoking is permitted, compare most favourably with the theatres, where it is not.'† In making the suggestion that some sort of reform might be met half-way, it may be mentioned that at a theatre lately visited, one of the upper galleries was used as a smoking-lounge, and yet the evidence of tobacco-smell in the lower portions of the building was inappreciable; it is only fair to state, however, that the system of ventilation was complete, and everything to be desired. Should the novelty of such a plan produce too strong a revulsion of feeling, we might well take a lesson from certain of the continental theatres, where two or more evenings are specially set aside each week as 'smoking-nights.' On the other hand, it must be borne in mind that the chief officers of the fire brigade are strongly opposed to smoking in these places of amusement.

In order to ensure effective arrangements for the control and management of theatres, etc., *legislation* is essential, having for its object the provision of conditions requisite for licensing the buildings and conducting the entertainments; also the appointment of officers, and other necessary regulations

* In London, 'it would seem to be under the authority conferred by sect. xiv., 6 and 7 Vic., c. 68, that the Lord Chamberlain might regulate the dress of performers.'—Geary, 'Law of Theatres and Music Halls,' London, 1885.

† The *Referee*, Jan., 1887.

(C.S.T.). The buildings, etc., for which license would have to be applied for, to include concert-halls, music-halls, travelling shows and circuses, even to the erection of impromptu stands or galleries, and other temporary structures. It seems to be a strange anomaly that a hall or concert-room not licensed to begin with, would require one if the representation of a stage-play were to take place, but not if a concert were to be given, though the dangers and risk to which the audience would in either case be exposed are practically the same. The licensing authority ought certainly to be representative, in order that the views of both managers and public might profit by the scrutiny of healthy discussion ; it is for this very reason that the London managers are so anxious to be responsible to the Home Office, and not to the Metropolitan Board of Works. In a certain sense it is true that theatres, public exhibitions, etc., in Sydney are licensed ; the method of procedure being as follows : When applications are made they are usually referred in the first instance to the police, to see if there is any police objection to the applicant or to the locality ; then they are referred to the Colonial Architect, for report as to ingress, egress, and general safety of the building ; and if all is satisfactory, the Colonial Secretary grants the license tenable for twelve months. During this period the manager or proprietor is practically his own master. He can apparently make any alteration in the building that he chooses : he may block up the doors, he may obstruct the stairways and corridors, and otherwise render the structure absolutely dangerous to life and property ; the only check on these misdemeanours being a threat from the Colonial Secretary to refuse an application for renewal of his license, should he require one.

Drawings, plans, specifications of theatres, concert-halls, etc., should be submitted to the licensing authority, without whose express permission and sanction no alterations or additions should be made ; and a statement should be required as to the nature of the interest of the person proposing to open such premises, in those premises.

Powers should be granted to this central authority for its architect and other accredited persons to enter and make *periodic inspections* so as to ascertain whether the structure of the buildings is efficiently maintained for the safety of the public frequenting them, also whether the regulations are being complied with in respect of all or any of the matters following :

The appliances provided for protection from fire, and the condition in which such appliances are kept and maintained.

The keeping of the gangways and staircases of such theatre or music-hall, etc., free from seats, persons standing, or any other form of obstruction.

The provision of oil-lamps or candles in the building itself, or in the exit corridors therefrom, for use in the event of extinction of the gas.

Each year a certificate as to these matters should be obtained from the licensing authority by each theatre, etc., and for opening without a certificate there should be the same penalty as if there were no license (M.B.W. proposed Act).

Such, then, is a scheme, imperfect it is true, for a study of Theatre Hygiene. It is improbable that, except under compulsion, the suggestions and reforms proposed in regard to building-construction, fittings and management will ever be carried out; managers, after all, are but human, and the resulting pecuniary loss would be too great. On the other hand, were I asked for an opinion as to the best means of supplying the public with healthy and safe structures, I would suggest the monopolizing of all theatres, concert-halls, etc., by the State, which would thus ensure a higher quality of acting, at the same time that it provided a better quality of buildings. This is already the plan adopted in some continental cities, and has been found to answer admirably.

THE END.





